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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/620,318 07/22/00 LOWREY

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MM41/1011

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ENERGY CONVERSION DEVICES INC
1675 WEST MAPLE ROAD
TROY MI 48084

EXAMINER

CAO, P

ART UNIT

PAPER NUMBER

2814

DATE MAILED:

10/11/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/620,318

Applicant(s)
Lowrey et al.

Examiner
Phat X. Cao

Art Unit
2814



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jul 25, 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above, claim(s) 41-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40 and 59-71 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) ☐ Other:

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DETAILED ACTION

Election/Restriction

1. Applicant's election without traverse of Group I, claims 1-40 and 59-71 in Paper No. 7 is acknowledged.

Claim Rejections - 35 USC § 112

2. Claim 22 recites the limitation "said conductive sidewall spacer" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

4. Claims 1-10, 13, 27-40, and 59-65 are rejected under 35 U.S.C. 102(e) as being anticipated by Gonzalez et al (US. 5,854,102).

Gonzalez discloses in Fig. 8 an electrically operated memory element, comprising: a volume of memory material 46 programmable to at least a first resistance state and a second

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resistance state (column 8, lines 34-40); and a polysilicon sidewall spacer (38,42) in electrical communication with the memory material 46, the polysilicon sidewall spacer (38,42) including a first region 38 doped with the second type dopant (column 7, lines 9-12) and having a first resistivity and a second region 42 heavily doped with the first type dopant (column 8, lines 11-13) and having a second resistivity greater than the first resistivity, where the second region 42 is adjacent to the memory material 46 and the first region 38 remotes to the memory material 46, and wherein the polysilicon sidewall spacer (38,42) is substantially vertically disposed and perpendicular to the memory material.

5. Claims 1-2, 4-5, 7-15, 17-18, 20-23, 25-40, 59-62, and 65-66 are rejected under 35 U.S.C. 102(e) as being anticipated by Ovshinsky (US. 5,687,112).

Ovshinsky discloses in Fig. 2 an electrically programmable, single-cell memory element, comprising: a volume of phase-change memory material 36 programmable to at least a first resistance state and a second state (column 7, lines 20-24) and a first contact (14,34) and a second contact 42 for supplying an electrical signal to the memory material 36, the first contact (14,34) having a raised portion 16 with narrowed width extending to an end adjacent to the memory material, and comprising a conductive sidewall spacer 14 made of refractory metal (column 14, lines 48-50) and having a first resistivity, and a conductive sidewall liner 34 made of carbon (column 15, lines 1-2) and having a second resistivity greater than the first resistivity, wherein the conductive sidewall liner 34 is adjacent to the memory material and the conductive sidewall spacer 14 is remote to the memory material. Ovshinsky further discloses in column 14,

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lines 35-40 that the first contact (14,34) can be formed as planar, vertically disposed or horizontally disposed by having a conical, pyramidal, elongated or wedge-shaped.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 4-5, 7-10, 12-15, 17-18, 20-40, 59-62, and 65-66 are rejected under 35 U.S.C. 102(b) as being anticipated by Ovshinsky et al (US. 5,414,271).

Ovshinsky discloses in Fig. 1 an electrically programmable, single-cell memory element, comprising: a volume of phase-change memory material 36 programmable to at least a first resistance state and a second resistance state (column 8, lines 24-27); and a first contact (32,34) and a second contact (38,40) for supplying an electrical signal to the memory material 36, the first contact (32,34) having a raised portion extending to an end adjacent to the memory material, and comprising a first region 32 made of refractory metal (column 16, lines 31-34) and having a first resistivity, and a second region 34 made of carbon (column 16, lines 34-35) and having a second resistivity greater than the first resistivity, wherein the second region 34 is adjacent to the memory material and the first region 32 is remote to the memory material.

Ovshinsky further discloses in Fig. 1 that the first contact layer (32,34) is substantially vertically and horizontally disposed, it has cup-like surface having an open end adjacent the

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memory material 36, and the area of contact between the first contact layer and the memory material is annular which encircles a cross-sectional slice of the memory material.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 11-12, 14-26, and 66-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonzalez et al (US. 5,854,102) in view of Tanahashi (US. 6,064,084).

As discussed in details above, Gonzalez substantially reads on the above claims, except it does not disclose that the polysilicon sidewall spacer (38,42) is cup-shaped having a raised portion extending to an end adjacent the memory material.


However, Tanahashi teaches in Fig. 2C the obviousness of forming the polysilicon sidewall liner 3 being cup-shaped, having a raised portion extending to an end, and having a second dielectric layer 4 formed over the polysilicon sidewall liner 3, wherein an edge portion of the polysilicon sidewall liner 3 is exposed. Accordingly, it would have been obvious to modify the device structure of Gonzalez by forming the polysilicon sidewall liner with the structures as set forth above, because according to Tanahashi, such structures would provide the benefits of reducing the contact resistance of the polysilicon sidewall liner (column 3, lines 62-64).

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is (703) 308-4917. The Examiner can normally be reached on Monday through Thursday. If attempts to reach the Examiner by telephone are unsuccessfully, the Examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956. Group 2800 fax number is (703) 308-7722 or (703) 308-7724.

PC
October 8, 2001


Cao, Phat X.
Patent Examiner
Technology Center 2800